

PATENT ABSTRACTS OF JAPAN

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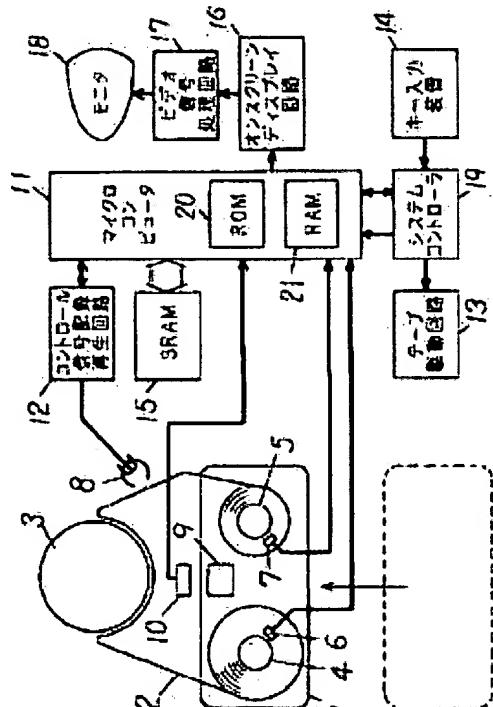
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(54) VIDEO TAPE RECORDER

(57)Abstract:

PURPOSE: To improve the control and the retrieval of information by providing a storage element, a micro computer and a means writing the content of the storage element in at least one of memories when a cassette is loaded.

CONSTITUTION: When the cassette 1 is inserted into a VTR, all data in a cassette memory 9 is read and written in an SRAM 15 by the micro computer 11. Then a matter that the memory 15 is used for an index system is confirmed by format check data. Thereafter, only the data in the SRAM 15 is edited till the cassette 1 is ejected from the VTR. That is, whenever one program is started to record, index information and recording positional information related to the program are added to the SRAM 15 and a program searching signal is recorded on a magnetic tape 2. Then, when the cassette 1 is ejected, the data in the SRAM 15 is written in the memory 9 for the first time.



CLAIMS

[Claim(s)]

[Claim 1]A storage cell attached to a cassette which stores a recording medium, and a microcomputer which has a read destination of two or more memories where a program was stored with a control terminal switched, A videotape recorder possessing a means by which the contents of said storage cell are written in one of said the memories at least when loaded with said cassette.

[Claim 2]By the program stored in the 1st memory started by power up of a microcomputer. A means which switches a read destination of a program with a control terminal based on existence of a detection hole set as data which wrote the contents of the storage cell in the 2nd memory at the time of charge of a cassette, and was written in said 2nd memory, or said cassette, A videotape recorder possessing a means switched to a program stored in said 1st memory at the time of discharge of said cassette.

[Claim 3]An information acquisition means which inputs or collects index information data about information which records a program stored in the 1st memory, A position detecting means which detects an absolute position of a recording medium stored by cassette, A search detection means to perform record reproduction of a searching signal to said recording medium, and the 1st writing means that writes said index information data and recording position information in the 2nd memory at the time of record, The 2nd writing means that writes the contents of said 2nd memory in a storage cell, A reading means which reads index information data and recording position information from said 2nd memory, A signal processing means for video-signal-izing index information data and recording position information which were read by said reading means, and outputting to a monitor, A selecting means which chooses information reproduced from index information data displayed on said monitor, The videotape recorder possessing recording position information corresponding to information with said selected selecting means, said position detecting means, and a search means to make automatic search reproduction of information selected by said search detection means perform according to claim 2.

[Claim 4]

The videotape recorder according to claim 2, wherein a program which is stored in a storage cell and transmitted to the 2nd memory possesses a system control means interlocked with recorded information on a recording medium.

[Claim 5]

While a microcomputer is connected by a controller and serial communication which perform system control and directing system control for said controller through this serial communication, The videotape recorder according to claim 2, wherein a control terminal is also connected to said controller.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] When this invention relates to a videotape recorder (VTR is called hereafter), and improves especially the operativity by leaps and bounds and it manages and retrieves the information recorded on magnetic tape, it is effective.

It is effective, when the information recorded on magnetic tape is interlocked with, and Automatic Control Division of the VTR is carried out or it changes the definition of the operation key of a VTR body for every magnetic tape.

[0002]

[Description of the Prior Art] There is the method of making the beginning of the information in magnetic tape to take out carry out the duty abnormal conditions of the control signal of a servo, and recording a searching signal on it as 1st means to retrieve the recorded information conventionally. It is called the VISS search function of the VHS standard which is the mainstream of what is called 1/2 inch of home use VTR, and they are a rapid traverse / thing which rewinds (FF/REW is called hereafter), detects said searching signal (VISS signal) in a state, and is made to shift to a halt condition or a reproduction state. As the 2nd means, it is a so-called counter search function using the linear time counter function which displays the enumerated data of the control signal of a servo, If it becomes the counted value corresponding to the beginning of the information in magnetic tape to take out in a FF/REW state, it will be made to shift to a stop or a reproduction state.

[0003] There is only the method of specifying reproduction modes, such as ordinary reproduction and adjustable-speed reproduction, manually with an operation key or a remote controller of VTR, etc. as a means which the recorded information reproduces, and enjoying.

[0004]

[Problem to be solved by the invention] However, as a problem in the case of retrieving the information recorded on magnetic tape by the above technique, There is a problem that the information which needs to rewind magnetic tape till the start of a volume and wants 1st to certainly search it before searching, since the present absolute position of magnetic tape is unknown in any case cannot be acquired promptly. It is necessary to stick on the cassette which indicates on a label etc. and stores [2nd] magnetic tape or it remembers counted value to be index information data, such as a title, in the case of a counter search function, since he does not forget what was recorded on magnetic tape. In order to avoid the failure of information to see and incorrect elimination which were recorded for the above Reason, only one information was recorded on one tape in many cases, and the utilization ratio of the tape was reduced.

[0005] It is difficult to be interlocked with an image and a sound with the conventional VTR as a problem in the case of playing the information recorded on magnetic tape, and to carry out

Automatic Control Division of the VTR operational modes, such as reproduction mode, Case [like the movie which he sees in ordinary reproduction mode from the beginning to the last, or a drama], it was satisfactory, but the image and the sound were interlocked with and there was a problem in realizing the game and the easy tape for study which are operated and enjoyed to an interactive system.

[0006]In the management and search of information which this invention solves the above-mentioned conventional problem, and were recorded on the tape, It aims at providing the videotape recorder which can improve the fault of random access nature by leaps and bounds, and can enjoy new applications, such as a video game and study video.

[0007]

[Means for solving problem]In order to solve the problem mentioned above, VTR of this invention is provided with the following.

The storage cell attached to the cassette which stores a recording medium.

The microcomputer which has the read destination of two or more memories where the program was stored with the control terminal switched.

A means by which the contents of the storage cell are written in the 2nd memory when loaded with a cassette by the program stored in the 1st memory started by the power up of a microcomputer.

The means which switches the read destination of a program with a control terminal based on the existence of the detection hole set as the data or the cassette written in the memory, and the means switched to the program stored in the 1st memory at the time of discharge of a cassette.

[0008]The information acquisition means which inputs or collects the index information data about the information which records the program stored in the 1st memory, The position detecting means which detects the absolute position of the recording medium stored by the cassette, A search detection means to perform record reproduction of a searching signal to a recording medium, and the 1st writing means that writes index information data and recording position information in the 2nd memory at the time of record, The 2nd writing means that writes the contents of the 2nd memory in a storage cell, and the reading means which reads index information data and recording position information from the 2nd memory, The signal processing means for video-signal-izing the index information data and recording position information which were read by the reading means, and outputting to a monitor, A means to choose the information reproduced from the index information data displayed on the monitor, the recording position information and the position detecting means corresponding to information with the selected selecting means, and a search means to make automatic search reproduction of the information selected by the search detection means perform are provided.

[0009]The program which is stored in a storage cell and transmitted to the 2nd memory possesses the system control means which is interlocked with the recorded information on a recording medium, and performs Automatic Control Division of VTR.

[0010]

[Function]In order to improve from the former the fault of the random access nature which was the biggest problem of VTR in the management and search of information which were recorded on magnetic tape by composition mentioned above in this invention, The storage cell to which the index information data and recording position information about the information to record were attached by the cassette is made to memorize, those information can be video-signal-ized if needed, a screen display can be carried out, and automatic search reproduction of the selected information can be carried out.

[0011]By the same composition, the software program of application can be stored in a storage cell for realization of VTR of new application, and the image and sound which were recorded on magnetic tape are interlocked with, and VTR has controlled automatically enough and it can carry out.

[0012]About the above change, it is realizable by the existence of the data of the specific address on a storage cell, or the detection hole of a cassette.

[0013]

[Working example]Hereafter, it explains, referring to Drawings for one working example of this invention.

[0014]The cassette 1 which drawing 1 is a block diagram showing the composition of one working example of the videotape recorder of this invention, and stores the magnetic tape 2, The rotating drum 3 which drives the rotary head (not shown) which carries out record reproduction of the information to the magnetic tape 2, The supply side reels (S reel is called hereafter) 4 which send out the magnetic tape 2 at the time of playback and a rapid traverse, The rolling-up side reel (T reel is called hereafter) 5 which rolls round the magnetic tape 2 at the time of playback and a rapid traverse, The supply-side-reels revolution speed sensor (S reel revolution speed sensor is called hereafter) 6 which detects the revolving speed of the S reel 4, The rolling-up side reel revolution speed sensor (T reel revolution speed sensor is called hereafter) 7 which detects the revolving speed of the T reel 5, The control head 8 which carries out record reproduction of the control signal for servos, . It is attached to the cassette 1 and memorize the index information data and the tape residual quantity information about the information recorded at the time of record. Or the non volatile semiconductor memory (a cassette memory is called hereafter) 9 which memorizes the software program of the microcomputer mentioned later and the connector 10 in contact with the input/output terminal of the cassette memory 9, The control signal record reproduction circuit 12 which reads to magnetic tape by writing in a searching signal via the control head 8, A key input device or the remote control units 14, such as timer reservation and VTR operation, The system controller 19 which determines the operational mode of VTR, etc. according to the input from the key input device or a remote control unit, The tape drive circuit 13 for driving a capstan motor (not shown) or a reel motor (not shown), in order to make the magnetic tape 2 transport according to the operational mode of VTR by instructions of the system controller 19, The static type random access memory (SRAM is called hereafter) 15 which incorporates all the information memorized by the cassette memory 9 when the cassette 1 is inserted in VTR, and is backed up by the cell (not shown) at the time of interruption to service,

The onscreen display circuit (an OSD circuit is called hereafter) 16, the video signal processing circuit 17, and the monitor 18 for displaying the index information data etc. which are memorized by SRAM15 at the time of necessity, The whole is constituted by the microcomputer 11 which controls the above system.

[0015]The operation is explained in detail below about VTR constituted as mentioned above. When the contents stored in the cassette memory 9 first of all are index information data and recording position information about recorded information of magnetic tape, That is, when it is index information data and recording position information about the information recorded on the tape, That is, the index information data about the information recorded on the tape are displayed on monitor display if needed, and the tape index system (an index system is only called hereafter) which carries out search playback of the recorded information specified by a user automatically by recording position information is explained.

[0016]A record date, recording start finish time, the channel number of a tuner, and the contents of the information which was called title name and to memorize can recognize index information data here later. By recording position information's being for memorizing where [of the tape] the information to record was recorded, for example, measuring the rotational cycle of the S reel 4, and the rotational cycle of the T reel 5, It is the tape residual quantity time from a recording start position to the end of tape, or is a time count value from beginning of tape, etc.

[0017]Drawing 2 is a map chart in case the contents memorized in the cassette memory 9 are data corresponding to an index system, and is a lower address (4 bits) about a horizontal axis (sequence), The upper address is expressing the space, and although an upper address is to the 0 to 9th street in this example, the last value of an upper address changes a vertical axis (line) according to memory space. 16 bytes of data of the top line of the 0th upper address is initialization data for a format check, they are whether a cassette memory is new, and a thing in use and the data corresponding to an index system in the contents if it is under use by this -- or it can be judged whether it is a software program. In the case of drawing 2, it is a case of an index system, and a password, a user name, and the present tape position are stored in the 2nd line, and the capacity of a cassette title and this cassette memory is stored in the 3rd line. The 1st row of each line is main ID, the 2nd row is a sub ID, it is for main ID identifying what data the line is, and a sub ID is for the cord formation of the data to identify something. If the 4th to 8th line is an index data area (b portion of drawing 2) and main ID of the 1st row is "02", If main ID of the 1st row is "03", days and months, a day of the week, recording start time, record finish time, a channel, a genre, a recording start position, and recording end position the line, As for the line, the title of the program in front of a party is memorized, and the cord formation of the title can distinguish now an ASCII code or the shifted JIS code by the sub ID of the 2nd row. The 9th line and the 10th line are maker application areas (c portion of drawing 2), the original application data of the maker shown in the manufacturer code of main ID of the 1st row are stored, and VTR not corresponding [a manufacturer code's] must change this data.

[0018]Then, if the cassette 1 is inserted in VTR, the microcomputer 11 will read all the data of the cassette memory 9 via the connector 10, and will write it in SRAM15. And it checks that the

cassette memory 15 is an object for index systems with the format check data mentioned above. If the cassette memory 9 is new, format check data will be initialized anew. Only the data on SRAM15 is edited until the cassette 1 is ejected from VTR after that. That is, whenever the recording start of the one program is carried out, the index information data and recording position information about the program are added to SRAM15, and a searching signal is recorded on the magnetic tape 2. At the time of the end of record, it piles up based on recording position information, and the existence of record is checked, and if there is heavy record, the original index information data and recording position information will be eliminated from on SRAM15. And when the cassette 1 is ejected, the data of SRAM15 shall be written in the cassette memory 9 for the first time. The microcomputer 11 and the cassette memory 9 of this are not parallel connection but serial connection, It is because 2 times reading, a comparison check, etc. will be required also in order to secure the reliability of data and sorting processing when standing in a line and changing data will become complicated, if it is connected via the connector 10 and reading and writing are always directly carried out to the cassette memory 9.

[0019]Next, one detection system of recording position information mentioned above is explained. Drawing 3 is the figure to which a portion of the cassette 1 of drawing 1 was expanded, and, thereby, explains a tape residual quantity time detecting method of the microcomputer 11 in detail. In drawing 3, a travel speed [m/s] of the magnetic tape 2 and r_{vt} A hub diameter [m] of S reel and T reel, A radius [m] to a magnetic tape periphery by which R_s and R_t were twisted around S reel and T reel, respectively, Magnetic tape in which S_s and S_t were twisted around S reel and T reel, respectively, area [m^2] and omegas including a real hub, and ω_s and ω_t are the angular rates of rotation [rad/s] of S reel and T reel, respectively.

[0020]By the way, angular velocity ω_s and ω_t can be obtained by measuring a cycle of a rotational-speed-detection signal detected from S reel revolution speed sensor 6 and T reel revolution speed sensor 7. Therefore, the radii R_s and R_t to a magnetic tape periphery twisted around S reel and T reel are called for by a following formula.

[0021]

[Mathematical formula 1]

$$R_s = V_t / \omega_s \quad (1)$$

[0022]

[Mathematical formula 2]

$$R_t = V_t / \omega_t \quad (2)$$

[0023]Therefore, the whole tape surface product S including a real hub equivalent to the length of magnetic tape currently wound around this cassette serves as a following formula.

[0024]

[Mathematical formula 3]

$$\begin{aligned} S &= S_s + S_t \\ &= \pi (R_s^2 + R_t^2) \end{aligned} \quad (3)$$

[0025]By the way, although it exists in the length of the magnetic tape currently wound around the cassette 1 in some numbers, by the VHS standard mentioned above, for example, there are a tape, a 90-minute tape, a 60-minute tape, a 30-minute tape, etc. for 120 minutes. Then, if it asks for whole tape surface product S_{120} , S_{90} , S_{60} , and S_{30} a priori about each tape, it is detectable whether the cassette 1 inserted in VTR now is a tape. Although the tape area S_{so} which includes the real hub by the side of S reel again is determined based on the result, S_{so} is expressed with a following formula supposing a detection result is a 120-minute tape, for example.

[0026]

[Mathematical formula 4]

$$S_{so} = S_{120} \cdot \omega t^2 / (\omega s^2 + \omega t^2) \quad (4)$$

[0027]And tape residual quantity L [m] can compute the residue time T [s] by breaking this by magnetic tape velocity by breaking the tape area of the net except the area of the real hub by tape thickness tau [m]. Jam, [0028]

[Mathematical formula 5]

$$L = (S_{so} - \pi r^2) / \tau \quad (5)$$

[0029]

[Mathematical formula 6]

$$T = L / V_t \quad (6)$$

[0030]Tape residual quantity information is searched for by calculating. The microcomputer 11 makes the searching signal ***** VISS signal which carried out the duty abnormal conditions of the control signal by said control signal record reproduction circuit 12 of drawing 1 at the time of a recording start record on the magnetic tape 2.

[0031]The recording format of the recording waveform of the control signal for explaining the VISS search function which pulls out the head by drawing 4 carrying out the duty abnormal conditions of the control signal, a regenerative waveform, and a searching signal is shown, When one cycle of a control signal is made into 100%, a high level..(H level is called hereafter) A period makes "0" pulses abbreviated 60% of a signal (drawing 4(A)), H level period makes "1" pulse abbreviated 27.5% of a signal (drawing 4(B)), and the search code as shown in drawing 4(C) at the beginning of a program which is got blocked at the time of the above-mentioned recording start, and is recorded is made to record. And this search code is detected and it is made to shift to reproduction mode by measuring the duty of a reproducing control signal at the time of a rapid traverse or rewinding at the time of VISS search.

[0032]By the way, although it divides roughly into record of VTR and there are usually record and timer record, When [at which timer reservation was carried out especially in timer record] not a time but a type rise is carried out and record is actually started, the microcomputer 11 shall receive the index information data stored in the microcomputer for timers (not shown), and it

shall write in SRAM15. That is, although timer reservation was carried out, it is for the prevention from malfunction at the time of not being recorded by a certain Reason.

[0033]The case where the tape recorded as mentioned above is played is explained below. If a cassette is first inserted in VTR, the microcomputer 11 will transmit all the contents of the cassette memory 9 to read-out SRAM15 via the connector 10 like the time at the time of record. And after checking that the cassette memory 15 is an object for index systems with the format check data mentioned above, index information data are read from SRAM15 and it is made to display on monitor display by the video signal processing circuit 17 via OSD circuit 16. Drawing 5 is that display example, a cassette title is "television recording", a user name is "papa" and, as for the cassette inserted in VTR in this case, five programs (program) are recorded on this tape in all now.

For example, the program of the program number 1 is the oil-painting theater of six channels recorded at 9:00 p.m. on October 20, and it is shown that the number of the program number 2 is the drama of ten channels recorded at 7:00 p.m. on October 25.

And if VTR is made into reproduction mode after choosing the program number on monitor display by the operation key 14, after pulling out the head of a program with the selected software program included in the microcomputer 11, it will be in a reproduction state automatically. It explains in detail using the mimetic diagram of the magnetic tape showing the flow chart of the software program included in the microcomputer 11 which shows drawing 6 the above operation, and the run state of VTR shown in drawing 7.

[0034]First, in the processing block 201 of drawing 6, tape residual quantity detection is performed the same with having explained at the time of registration, and the present tape position (d point of drawing 7) is detected. Size comparison with the tape residual quantity time stored in SRAM15 detected at the time of record of the program chosen in the brunch 202 next and the present tape residual quantity time detected by the processing block 201 is performed, By the result, to a target point (f point of drawing 7), 10 minutes or more, if a current position is this side (on the left of e point of drawing 7), it will shift to the processing block 203, and VTR is changed into a rapid-traverse (FF) state, If a current position is 10-minute or more back (on the right of g point of drawing 7) to a target position, it will shift to the processing block 204, VTR will be rewound (REW), and it will change into a state, and will return to the processing block 201, respectively. If a current position is less than 10 minutes to a target position, it will change into the VISS search state which shifted to the processing block 205 and mentioned VTR above, and if the search code of the selected program is detected, VTR will be made into reproduction mode in the processing block 206, and a series of retrieving operation will be completed. That is, outline detection of the position on which the program was recorded is carried out by a tape residual quantity detection function, and a VISS search function detects with high precision after that.

[0035]By the way, although the tape residual quantity detection function and the VISS search function have realized the tape position detection means in this example, For example, a tape position may be detected superimposing a time code etc. on a control signal or a video signal,

recording them, and detecting the time code at the time of playback, or by calculating a control signal from the start of a tape volume.

[0036]Next, when the contents stored in the cassette memory 9 are software programs, That is, the index system mentioned above with the composition of drawing 1 is different new application, An image and a sound are interlocked with, Automatic Control Division of the VTR operational modes, such as reproduction mode, is carried out, or an image and a sound are interlocked with, and the program cassette system (a program system is only called hereafter) which realizes the game operated and enjoyed to an interactive system and easy video for study is explained.

[0037]Drawing 8 is a map chart in case the contents memorized in the cassette memory 9 are data corresponding to a program system, and is a lower address (4 bits) about a horizontal axis (sequence), The above-mentioned address is expressing the space, and although an upper address is to the 0 to 9th street in this example, the last value of an upper address changes a vertical axis (line) according to memory space. 16 bytes of data of the top line of the 0th upper address is initialization data for a format check, and it can judge that the contents of the cassette memory 9 are software programs by this.

[0038]Read-only memory which drawing 9 has in an inside of the microcomputer 11 of drawing 1. (Internal ROM is called hereafter) It is a main flowchart of a software program carried in 20, If it confirms whether the cassette 1 was inserted in VTR in the brunch 207 and the slot in of the cassette 1 is carried out, it will shift to the processing block 208 and all the contents of the cassette memory 9 will be transmitted to SRAM15. This cassette memory 9 distinguishes an object for index systems, or an object for program systems by the after-transmission brunch 209 with drawing 2 and format check data which comprises 16 bytes of the top line of a memory map figure of drawing 8, If it is an object for index systems, it will shift to the processing block 210, and a software program of an index system explained by drawing 7 from drawing 2 is started. On the other hand, if the cassette memory 9 is an object for program systems, it will shift to the processing block 211, reset in external ROM mode will be required of the system controller 19 of drawing 1, and it will be in wait status. That is, internal ROM mode in which the microcomputer 11 operates by internal ROM, It has the external ROM mode in which it operates by external ROM, as equivalent to external ROM in SRAM15, it is constituted, and in response to a demand like the point, to the microcomputer 11, the system controller 19 switches a ROM mode control terminal outside, and carries out a reset start from an inside. Then, the microcomputer 11 is started by a program stored in SRAM15, i.e., a program stored in the cassette memory 9. And the microcomputer 11 and the system controller 19 are connected in a communication bus, and the microcomputer 11 can control VTR by this communication bus freely. A different program by this for every cassette can be installed in VTR, and application interlocked with an image and a sound can be realized.

[0039]Drawing 10 is a flow chart of one working example of the application program written in the cassette memory 9 for program systems, If VTR plays magnetic tape to a specific position, it will be in a still playback state automatically, and the head of the next playback position will be

pulled out by a dialog with a user. Drawing 11 is a mimetic diagram of the magnetic tape for expressing the reproduction state of VTR, in order to explain the flow chart of drawing 10. [0040]First, in the processing block 90 of drawing 10, rewind VTR (REW), and it is set in a mode, It is confirmed whether the magnetic tape 2 wound and returned to the start edge by the brunch 91, If rolling up is completed, the tape counter (not shown) of VTR will be reset by the processing block 92, It is made to shift to VTR ordinary reproduction (PLAY) mode in the processing block 93, If it confirms that the enumerated data of a tape counter are set to "i" by the brunch 94 and the enumerated data of a tape counter are set to "i", in the processing block 95, the pause (still playback) state of the VTR is carried out, and it will be in the state of the waiting for a keystroke by the brunch 96. If drawing 11 explains this, it was in the reproduction pause condition automatically in that reproduce from the beginning of tape 0 (zero), i.e., a tape counter value, and a tape counter value is set to "i", and the reproduced image in that case would be shown in drawing 11, and will demand the response of a keystroke of a user. If a user presses the "channel DOWN" key here, it will shift to the processing block 99, and a pause condition is canceled and it is made to shift to ordinary reproduction. If a user presses the "channel UP" key, it will shift to the processing block 97, and a pause condition is canceled and it is made to shift to rapid-traverse (CUE) mode. And when the enumerated data of a tape counter are set to "j" in the brunch 98, VTR is made to shift to ordinary reproduction in the processing block 99. When drawing 11 explains this, the next reproduction starting position will be controlled to operation of the user who answered according to directions of the reproduction screen in a tape counter value "i." For example, if this system is applied to study, that answer explanation will be recorded [the tape counter value] for the question matter on "i" from "i" by "j", If a keystroke of the user in a tape counter value "i" is a correct answer, it will be fast forwarded by the point of a tape counter value "j" that the following question matter is recorded, and if it is misunderstanding, the answer will be reproduced automatically.

[0041]Drawing 10 and drawing 11 are very fundamental working examples, and are freely controllable by a communication bus of the microcomputer 11 and the system controller 19 also about control of VTR, The same processing as said system controller 19 is possible by a program fundamentally built in the cassette memory 9.

[0042]It is more possible than setting a manufacturer code, form specification of the microcomputer 11, etc. as first half initialization data to also make VTR with which the program stored in the cassette memory 9 operates specify.

[0043]

[Effect of the Invention]As mentioned above the videotape recorder of this invention, In the management and search of information which were recorded on the tape by using the cassette by which the cassette memory was attached, it not only improves the fault of the random access nature which was the biggest problem of the conventional VTR by leaps and bounds, but, Control of VTR which included the program interlocked with the image recorded like a soft tape and the sound in the cassette memory, and is respectively different with the same composition can be realized for every cassette, With the conventional VTR, new applications, such as a video

game which was difficult for realization, and study video, can be enjoyed.

TECHNICAL FIELD

[Industrial Application] When this invention relates to a videotape recorder (VTR is called hereafter), and improves especially the operativity by leaps and bounds and it manages and retrieves the information recorded on magnetic tape, it is effective.

It is effective, when the information recorded on magnetic tape is interlocked with, and Automatic Control Division of the VTR is carried out or it changes the definition of the operation key of a VTR body for every magnetic tape.

PRIOR ART

[Description of the Prior Art] There is the method of making the beginning of the information in magnetic tape to take out carry out the duty abnormal conditions of the control signal of a servo, and recording a searching signal on it as 1st means to retrieve the recorded information conventionally. It is called the VISS search function of the VHS standard which is the mainstream of what is called 1/2 inch of home use VTR, and they are a rapid traverse / thing which rewinds (FF/REW is called hereafter), detects said searching signal (VISS signal) in a state, and is made to shift to a halt condition or a reproduction state. As the 2nd means, it is a so-called counter search function using the linear time counter function which displays the enumerated data of the control signal of a servo, If it becomes the counted value corresponding to the beginning of the information in magnetic tape to take out in a FF/REW state, it will be made to shift to a stop or a reproduction state.

[0003] There is only the method of specifying reproduction modes, such as ordinary reproduction and adjustable-speed reproduction, manually with an operation key or a remote controller of VTR, etc. as a means which the recorded information reproduces, and enjoying.

EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above the videotape recorder of this invention, In the management and search of information which were recorded on the tape by using the cassette by which the cassette memory was attached, it not only improves the fault of the random access nature which was the biggest problem of the conventional VTR by leaps and bounds, but, Control of VTR which included the program interlocked with the image recorded like a soft tape and the sound in the cassette memory, and is respectively different with the same composition can be realized for every cassette, With the conventional VTR, new applications, such as a video game which was difficult for realization, and study video, can be enjoyed.

TECHNICAL PROBLEM

[Problem to be solved by the invention] However, as a problem in the case of retrieving the information recorded on magnetic tape by the above technique, There is a problem that the information which needs to rewind magnetic tape till the start of a volume and wants 1st to certainly search it before searching, since the present absolute position of magnetic tape is unknown in any case cannot be acquired promptly. It is necessary to stick on the cassette which indicates on a label etc. and stores [2nd] magnetic tape or it remembers counted value to be index information data, such as a title, in the case of a counter search function, since he does not forget what was recorded on magnetic tape. In order to avoid the failure of information to see and incorrect elimination which were recorded for the above Reason, only one information was recorded on one tape in many cases, and the utilization ratio of the tape was reduced.

[0005] It is difficult to be interlocked with an image and a sound with the conventional VTR as a problem in the case of playing the information recorded on magnetic tape, and to carry out Automatic Control Division of the VTR operational modes, such as reproduction mode, Case [like the movie which he sees in ordinary reproduction mode from the beginning to the last, or a drama], it was satisfactory, but the image and the sound were interlocked with and there was a problem in realizing the game and the easy tape for study which are operated and enjoyed to an interactive system.

[0006] In the management and search of information which this invention solves the above-mentioned conventional problem, and were recorded on the tape, It aims at providing the videotape recorder which can improve the fault of random access nature by leaps and bounds, and can enjoy new applications, such as a video game and study video.

MEANS

[Means for solving problem] In order to solve the problem mentioned above, VTR of this invention is provided with the following.

The storage cell attached to the cassette which stores a recording medium.

The microcomputer which has the read destination of two or more memories where the program was stored with the control terminal switched.

A means by which the contents of the storage cell are written in the 2nd memory when loaded with a cassette by the program stored in the 1st memory started by the power up of a microcomputer.

The means which switches the read destination of a program with a control terminal based on the existence of the detection hole set as the data or the cassette written in the memory, and the means switched to the program stored in the 1st memory at the time of discharge of a cassette.

[0008] The information acquisition means which inputs or collects the index information data about the information which records the program stored in the 1st memory, The position detecting means which detects the absolute position of the recording medium stored by the

cassette, A search detection means to perform record reproduction of a searching signal to a recording medium, and the 1st writing means that writes index information data and recording position information in the 2nd memory at the time of record, The 2nd writing means that writes the contents of the 2nd memory in a storage cell, and the reading means which reads index information data and recording position information from the 2nd memory, The signal processing means for video-signal-izing the index information data and recording position information which were read by the reading means, and outputting to a monitor, A means to choose the information reproduced from the index information data displayed on the monitor, the recording position information and the position detecting means corresponding to information with the selected selecting means, and a search means to make automatic search reproduction of the information selected by the search detection means perform are provided.

[0009]The program which is stored in a storage cell and transmitted to the 2nd memory possesses the system control means which is interlocked with the recorded information on a recording medium, and performs Automatic Control Division of VTR.

OPERATION

[Function]In order to improve from the former the fault of the random access nature which was the biggest problem of VTR in the management and search of information which were recorded on magnetic tape by composition mentioned above in this invention, The storage cell to which the index information data and recording position information about the information to record were attached by the cassette is made to memorize, those information can be video-signal-ized if needed, a screen display can be carried out, and automatic search reproduction of the selected information can be carried out.

[0011]By the same composition, the software program of application can be stored in a storage cell for realization of VTR of new application, and the image and sound which were recorded on magnetic tape are interlocked with, and VTR has controlled automatically enough and it can carry out.

[0012]About the above change, it is realizable by the existence of the data of the specific address on a storage cell, or the detection hole of a cassette.

EXAMPLE

[Working example]Hereafter, it explains, referring to Drawings for one working example of this invention.

[0014]The cassette 1 which drawing 1 is a block diagram showing the composition of one working example of the videotape recorder of this invention, and stores the magnetic tape 2, The rotating drum 3 which drives the rotary head (not shown) which carries out record reproduction of the information to the magnetic tape 2, The supply side reels (S reel is called hereafter) 4 which send out the magnetic tape 2 at the time of playback and a rapid traverse, The rolling-up side reel (T reel is called hereafter) 5 which rolls round the magnetic tape 2 at the time of

playback and a rapid traverse, The supply-side-reels revolution speed sensor (S reel revolution speed sensor is called hereafter) 6 which detects the revolving speed of the S reel 4, The rolling-up side reel revolution speed sensor (T reel revolution speed sensor is called hereafter) 7 which detects the revolving speed of the T reel 5, The control head 8 which carries out record reproduction of the control signal for servos, . It is attached to the cassette 1 and memorize the index information data and the tape residual quantity information about the information recorded at the time of record. Or the non volatile semiconductor memory (a cassette memory is called hereafter) 9 which memorizes the software program of the microcomputer mentioned later and the connector 10 in contact with the input/output terminal of the cassette memory 9, The control signal record reproduction circuit 12 which reads to magnetic tape by writing in a searching signal via the control head 8, A key input device or the remote control units 14, such as timer reservation and VTR operation, The system controller 19 which determines the operational mode of VTR, etc. according to the input from the key input device or a remote control unit, The tape drive circuit 13 for driving a capstan motor (not shown) or a reel motor (not shown), in order to make the magnetic tape 2 transport according to the operational mode of VTR by instructions of the system controller 19, The static type random access memory (SRAM is called hereafter) 15 which incorporates all the information memorized by the cassette memory 9 when the cassette 1 is inserted in VTR, and is backed up by the cell (not shown) at the time of interruption to service, The onscreen display circuit (an OSD circuit is called hereafter) 16, the video signal processing circuit 17, and the monitor 18 for displaying the index information data etc. which are memorized by SRAM15 at the time of necessity, The whole is constituted by the microcomputer 11 which controls the above system.

[0015]The operation is explained in detail below about VTR constituted as mentioned above. When the contents stored in the cassette memory 9 first of all are index information data and recording position information about recorded information of magnetic tape, That is, when it is index information data and recording position information about the information recorded on the tape, That is, the index information data about the information recorded on the tape are displayed on monitor display if needed, and the tape index system (an index system is only called hereafter) which carries out search playback of the recorded information specified by a user automatically by recording position information is explained.

[0016]A record date, recording start finish time, the channel number of a tuner, and the contents of the information which was called title name and to memorize can recognize index information data here later. By recording position information's being for memorizing where [of the tape] the information to record was recorded, for example, measuring the rotational cycle of the S reel 4, and the rotational cycle of the T reel 5, It is the tape residual quantity time from a recording start position to the end of tape, or is a time count value from beginning of tape, etc.

[0017]Drawing 2 is a map chart in case the contents memorized in the cassette memory 9 are data corresponding to an index system, and is a lower address (4 bits) about a horizontal axis (sequence), The upper address is expressing the space, and although an upper address is to the 0 to 9th street in this example, the last value of an upper address changes a vertical axis (line)

according to memory space. 16 bytes of data of the top line of the 0th upper address is initialization data for a format check, they are whether a cassette memory is new, and a thing in use and the data corresponding to an index system in the contents if it is under use by this -- or it can be judged whether it is a software program. In the case of drawing 2, it is a case of an index system, and a password, a user name, and the present tape position are stored in the 2nd line, and the capacity of a cassette title and this cassette memory is stored in the 3rd line. The 1st row of each line is main ID, the 2nd row is a sub ID, it is for main ID identifying what data the line is, and a sub ID is for the cord formation of the data to identify something. If the 4th to 8th line is an index data area (b portion of drawing 2) and main ID of the 1st row is "02", If main ID of the 1st row is "03", days and months, a day of the week, recording start time, record finish time, a channel, a genre, a recording start position, and recording end position the line, As for the line, the title of the program in front of a party is memorized, and the cord formation of the title can distinguish now an ASCII code or the shifted JIS code by the sub ID of the 2nd row. The 9th line and the 10th line are maker application areas (c portion of drawing 2), the original application data of the maker shown in the manufacturer code of main ID of the 1st row are stored, and VTR not corresponding [a manufacturer code's] must change this data.

[0018]Then, if the cassette 1 is inserted in VTR, the microcomputer 11 will read all the data of the cassette memory 9 via the connector 10, and will write it in SRAM15. And it checks that the cassette memory 15 is an object for index systems with the format check data mentioned above. If the cassette memory 9 is new, format check data will be initialized anew. Only the data on SRAM15 is edited until the cassette 1 is ejected from VTR after that. That is, whenever the recording start of the one program is carried out, the index information data and recording position information about the program are added to SRAM15, and a searching signal is recorded on the magnetic tape 2. At the time of the end of record, it piles up based on recording position information, and the existence of record is checked, and if there is heavy record, the original index information data and recording position information will be eliminated from on SRAM15. And when the cassette 1 is ejected, the data of SRAM15 shall be written in the cassette memory 9 for the first time. The microcomputer 11 and the cassette memory 9 of this are not parallel connection but serial connection, It is because 2 times reading, a comparison check, etc. will be required also in order to secure the reliability of data and sorting processing when standing in a line and changing data will become complicated, if it is connected via the connector 10 and reading and writing are always directly carried out to the cassette memory 9.

[0019]Next, one detection system of the recording position information mentioned above is explained. Drawing 3 is the figure to which the portion of the cassette 1 of drawing 1 was expanded, and, thereby, explains the tape residual quantity time detecting method of the microcomputer 11 in detail. In drawing 3, the travel speed [m/s] of the magnetic tape 2 and $r V_t$ The hub diameter [m] of S reel and T reel, The radius [m] to the magnetic tape periphery by which R_s and R_t were twisted around S reel and T reel, respectively, The magnetic tape in which S_s and S_t were twisted around S reel and T reel, respectively, area [m^2] and omegas including a real hub, and ω_s and ω_t are the angular rates of rotation [rad/s] of S reel and T reel, respectively.

[0020]By the way, angular velocity omegas and omegat can be obtained by measuring the cycle of the rotational-speed-detection signal detected from S reel revolution speed sensor 6 and T reel revolution speed sensor 7. Therefore, the radii Rs and Rt to the magnetic tape periphery twisted around S reel and T reel are called for by a following formula.

[0021]

[Mathematical formula 1]

$$R_s = V_t / \omega_s \quad (1)$$

[0022]

[Mathematical formula 2]

$$R_t = V_t / \omega_t \quad (2)$$

[0023]Therefore, the whole tape surface product S including a real hub equivalent to the length of the magnetic tape currently wound around this cassette serves as a following formula.

[0024]

[Mathematical formula 3]

$$\begin{aligned} S &= S_s + S_t \\ &= \pi (R_s^2 + R_t^2) \end{aligned} \quad (3)$$

[0025]By the way, although it exists in the length of the magnetic tape currently wound around the cassette 1 in some numbers, by the VHS standard mentioned above, for example, there are a tape, a 90-minute tape, a 60-minute tape, a 30-minute tape, etc. for 120 minutes. Then, if it asks for whole tape surface product S_{120} , S_{90} , S_{60} , and S_{30} a priori about each tape, it is detectable whether the cassette 1 inserted in VTR now is a tape. Although the tape area S_{so} which includes the real hub by the side of S reel again is determined based on the result, S_{so} is expressed with a following formula supposing a detection result is a 120-minute tape, for example.

[0026]

[Mathematical formula 4]

$$S_{so} = S_{120} \cdot \omega_t^2 / (\omega_s^2 + \omega_t^2) \quad (4)$$

[0027]And tape residual quantity L [m] can compute the residue time T [s] by breaking this by magnetic tape velocity by breaking the tape area of the net except the area of the real hub by tape thickness tau [m]. Jam, [0028]

[Mathematical formula 5]

$$L = (S_{so} - \pi r^2) / \tau \quad (5)$$

[0029]

[Mathematical formula 6]

$$T = L / V_t \quad (6)$$

[0030]Tape residual quantity information is searched for by calculating. The microcomputer 11 makes the searching signal ***** VISS signal which carried out the duty abnormal conditions of the control signal by said control signal record reproduction circuit 12 of drawing 1 at the time of a recording start record on the magnetic tape 2.

[0031]The recording format of the recording waveform of the control signal for explaining the VISS search function which pulls out the head by drawing 4 carrying out the duty abnormal conditions of the control signal, a regenerative waveform, and a searching signal is shown, When one cycle of a control signal is made into 100%, a high level. (H level is called hereafter) A period makes "0" pulses abbreviated 60% of a signal (drawing 4(A)), H level period makes "1" pulse abbreviated 27.5% of a signal (drawing 4(B)), and the search code as shown in drawing 4(C) at the beginning of a program which is got blocked at the time of the above-mentioned recording start, and is recorded is made to record. And this search code is detected and it is made to shift to reproduction mode by measuring the duty of a reproducing control signal at the time of a rapid traverse or rewinding at the time of VISS search.

[0032]By the way, although it divides roughly into record of VTR and there are usually record and timer record, When [at which timer reservation was carried out especially in timer record] not a time but a type rise is carried out and record is actually started, the microcomputer 11 shall receive the index information data stored in the microcomputer for timers (not shown), and it shall write in SRAM15. That is, although timer reservation was carried out, it is for the prevention from malfunction at the time of not being recorded by a certain Reason.

[0033]The case where the tape recorded as mentioned above is played is explained below. If a cassette is first inserted in VTR, the microcomputer 11 will transmit all the contents of the cassette memory 9 to read-out SRAM15 via the connector 10 like the time at the time of record. And after checking that the cassette memory 15 is an object for index systems with the format check data mentioned above, index information data are read from SRAM15 and it is made to display on monitor display by the video signal processing circuit 17 via OSD circuit 16. Drawing 5 is that display example, a cassette title is "television recording", a user name is "papa" and, as for the cassette inserted in VTR in this case, five programs (program) are recorded on this tape in all now.

For example, the program of the program number 1 is the oil-painting theater of six channels recorded at 9:00 p.m. on October 20, and it is shown that the number of the program number 2 is the drama of ten channels recorded at 7:00 p.m. on October 25.

And if VTR is made into reproduction mode after choosing the program number on monitor display by the operation key 14, after pulling out the head of a program with the selected software program included in the microcomputer 11, it will be in a reproduction state automatically. It explains in detail using the mimetic diagram of the magnetic tape showing the flow chart of the software program included in the microcomputer 11 which shows drawing 6 the above operation, and the run state of VTR shown in drawing 7.

[0034]First, in the processing block 201 of drawing 6, tape residual quantity detection is

performed the same with having explained at the time of registration, and the present tape position (d point of drawing 7) is detected. Size comparison with the tape residual quantity time stored in SRAM15 detected at the time of record of the program chosen in the brunch 202 next and the present tape residual quantity time detected by the processing block 201 is performed, By the result, to a target point (f point of drawing 7), 10 minutes or more, if a current position is this side (on the left of e point of drawing 7), it will shift to the processing block 203, and VTR is changed into a rapid-traverse (FF) state, If a current position is 10-minute or more back (on the right of g point of drawing 7) to a target position, it will shift to the processing block 204, VTR will be rewound (REW), and it will change into a state, and will return to the processing block 201, respectively. If a current position is less than 10 minutes to a target position, it will change into the VISS search state which shifted to the processing block 205 and mentioned VTR above, and if the search code of the selected program is detected, VTR will be made into reproduction mode in the processing block 206, and a series of retrieving operation will be completed. That is, outline detection of the position on which the program was recorded is carried out by a tape residual quantity detection function, and a VISS search function detects with high precision after that.

[0035]By the way, although the tape residual quantity detection function and the VISS search function have realized the tape position detection means in this example, For example, a tape position may be detected superimposing a time code etc. on a control signal or a video signal, recording them, and detecting the time code at the time of playback, or by calculating a control signal from the start of a tape volume.

[0036]Next, when the contents stored in the cassette memory 9 are software programs, That is, the index system mentioned above with the composition of drawing 1 is different new application, An image and a sound are interlocked with, Automatic Control Division of the VTR operational modes, such as reproduction mode, is carried out, or an image and a sound are interlocked with, and the program cassette system (a program system is only called hereafter) which realizes the game operated and enjoyed to an interactive system and easy video for study is explained.

[0037]Drawing 8 is a map chart in case the contents memorized in the cassette memory 9 are data corresponding to a program system, and is a lower address (4 bits) about a horizontal axis (sequence), The above-mentioned address is expressing the space, and although an upper address is to the 0 to 9th street in this example, the last value of an upper address changes a vertical axis (line) according to memory space. 16 bytes of data of the top line of the 0th upper address is initialization data for a format check, and it can judge that the contents of the cassette memory 9 are software programs by this.

[0038]The read-only memory which drawing 9 has in the inside of the microcomputer 11 of drawing 1. (Internal ROM is called hereafter) It is a main flowchart of the software program carried in 20, If it confirms whether the cassette 1 was inserted in VTR in the brunch 207 and the slot in of the cassette 1 is carried out, it will shift to the processing block 208 and all the contents of the cassette memory 9 will be transmitted to SRAM15. This cassette memory 9 distinguishes

the object for index systems, or the object for program systems by the after-transmission brunch 209 with drawing 2 and the format check data which comprises 16 bytes of the top line of the memory map figure of drawing 8, If it is an object for index systems, it will shift to the processing block 210, and the software program of the index system explained by drawing 7 from drawing 2 is started. On the other hand, if the cassette memory 9 is an object for program systems, it will shift to the processing block 211, reset in external ROM mode will be required of the system controller 19 of drawing 1, and it will be in wait status. That is, the internal ROM mode in which the microcomputer 11 operates by internal ROM, It has the external ROM mode in which it operates by external ROM, as equivalent to external ROM in SRAM15, it is constituted, and in response to the demand like the point, to the microcomputer 11, the system controller 19 switches a ROM mode control terminal outside, and carries out a reset start from an inside. Then, the microcomputer 11 is started by the program stored in SRAM15, i.e., the program stored in the cassette memory 9. And the microcomputer 11 and the system controller 19 are connected in the communication bus, and the microcomputer 11 can control VTR by this communication bus freely. A different program by this for every cassette can be installed in VTR, and application interlocked with the image and the sound can be realized.

[0039]Drawing 10 is a flow chart of one working example of the application program written in the cassette memory 9 for program systems, If VTR plays magnetic tape to a specific position, it will be in a still playback state automatically, and the head of the next playback position will be pulled out by a dialog with a user. Drawing 11 is a mimetic diagram of the magnetic tape for expressing the reproduction state of VTR, in order to explain the flow chart of drawing 10.

[0040]First, in the processing block 90 of drawing 10, rewind VTR (REW), and it is set in a mode, It is confirmed whether the magnetic tape 2 wound and returned to the start edge by the brunch 91, If rolling up is completed, the tape counter (not shown) of VTR will be reset by the processing block 92, It is made to shift to VTR ordinary reproduction (PLAY) mode in the processing block 93, If it confirms that the enumerated data of a tape counter are set to "i" by the brunch 94 and the enumerated data of a tape counter are set to "i", in the processing block 95, the pause (still playback) state of the VTR is carried out, and it will be in the state of the waiting for a keystroke by the brunch 96. If drawing 11 explains this, it was in the reproduction pause condition automatically in that reproduce from the beginning of tape 0 (zero), i.e., a tape counter value, and a tape counter value is set to "i", and the reproduced image in that case would be shown in drawing 11, and will demand the response of a keystroke of a user. If a user presses the "channel DOWN" key here, it will shift to the processing block 99, and a pause condition is canceled and it is made to shift to ordinary reproduction. If a user presses the "channel UP" key, it will shift to the processing block 97, and a pause condition is canceled and it is made to shift to rapid-traverse (CUE) mode. And when the enumerated data of a tape counter are set to "j" in the brunch 98, VTR is made to shift to ordinary reproduction in the processing block 99. When drawing 11 explains this, the next reproduction starting position will be controlled to operation of the user who answered according to directions of the reproduction screen in a tape counter value "i." For example, if this system is applied to study, that answer explanation will be

recorded [the tape counter value] for the question matter on "i" from "i" by "j", If a keystroke of the user in a tape counter value "i" is a correct answer, it will be fast forwarded by the point of a tape counter value "j" that the following question matter is recorded, and if it is misunderstanding, the answer will be reproduced automatically.

[0041]Drawing 10 and drawing 11 are very fundamental working examples, and are freely controllable by the communication bus of the microcomputer 11 and the system controller 19 also about control of VTR, The same processing as said system controller 19 is possible by the program fundamentally built in the cassette memory 9.

[0042]It is more possible than setting a manufacturer code, form specification of the microcomputer 11, etc. as first half initialization data to also make VTR with which the program stored in the cassette memory 9 operates specify.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The block diagram showing the composition of one working example of the videotape recorder of this invention

[Drawing 2]A map chart in case the contents memorized in the cassette memory of the working example are data corresponding to an index system

[Drawing 3]The enlarged drawing of the cassette portions of the working example

[Drawing 4]The recording format figure of the recording waveform of the control signal for explaining about the VISS search function of the working example, a regenerative waveform, and a searching signal

[Drawing 5]The monitor display display example of the working example

[Drawing 6]The flow chart of the software program included in the microcomputer of the working example

[Drawing 7]The mimetic diagram of the magnetic tape showing the run state of VTR of the working example

[Drawing 8]A map chart in case the contents memorized in the cassette memory of the working example are data corresponding to a program system

[Drawing 9]The main flowchart of the software program carried in internal ROM of the microcomputer of the working example

[Drawing 10]The flow chart of one working example of the application program written in the cassette memory for the program systems of the working example

[Drawing 11]The mimetic diagram of the magnetic tape for expressing the reproduction state of VTR of the working example

[Explanations of letters or numerals]

1 Cassette

2 Magnetic tape

3 Rotating drum

4 Supply side reels

5 Rolling-up side reel

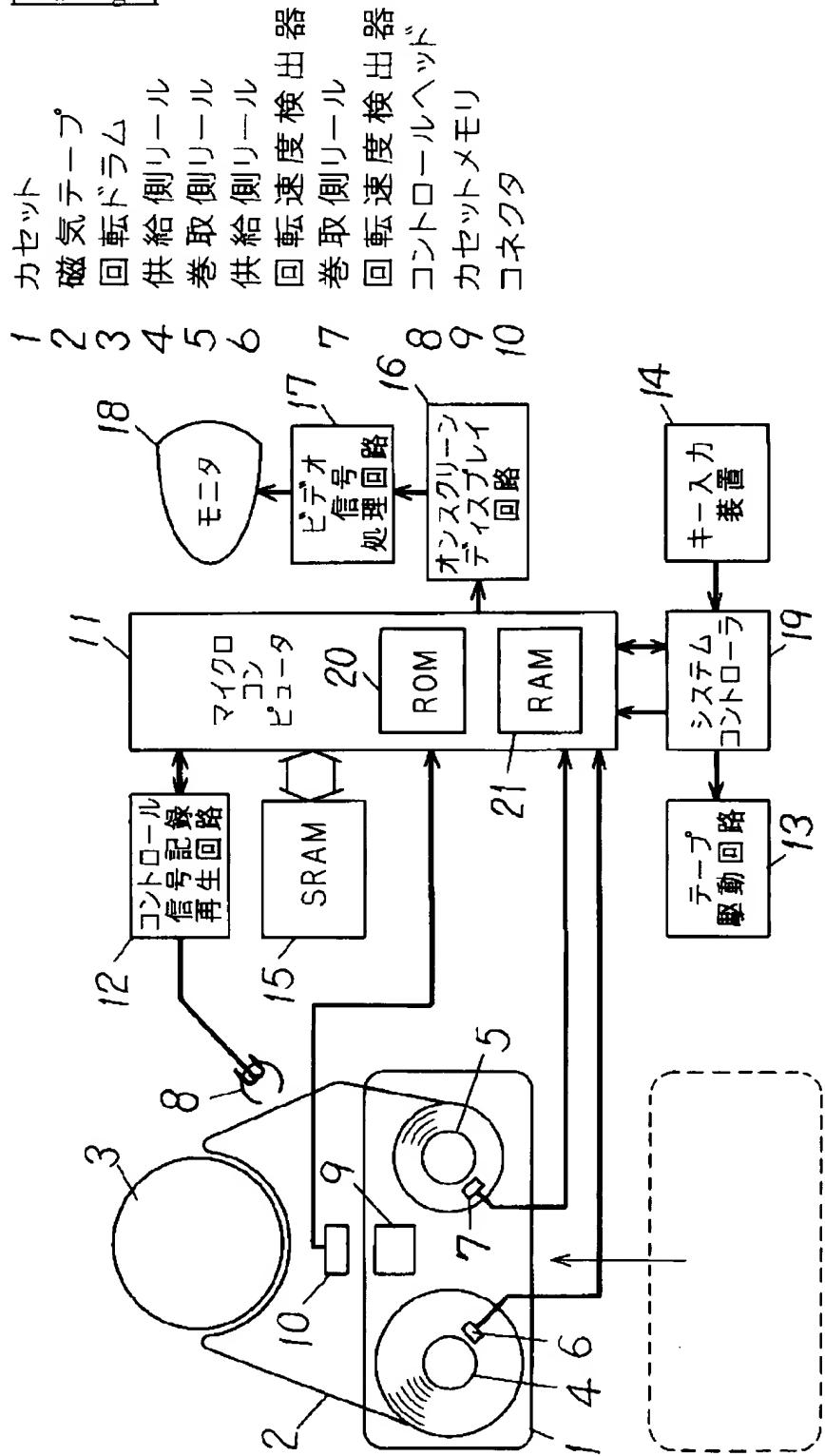
6 Supply-side-reels revolution speed sensor

7 Rolling-up side reel revolution speed sensor

- 8 Control head
- 9 Cassette memory
- 10 Connector
- 11 Microcomputer
- 12 Control signal recording and reproducing device
- 13 Tape drive circuit
- 14 Key input device
- 15 SRAM
- 16 Onscreen display circuit
- 17 Video signal processing circuit
- 18 Monitor
- 19 System controller
- 20 Internal ROM
- 21 Internal RAM

DRAWINGS

[Drawing 1]



0

16

Drawing 21

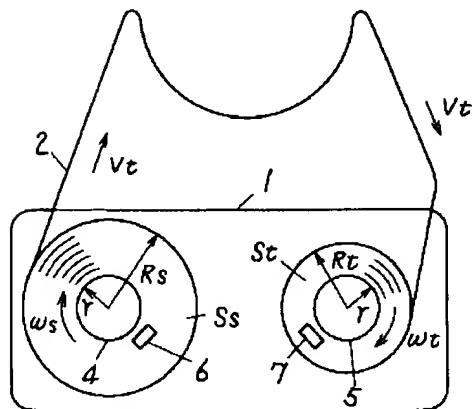
フォーマットチェック									
サブID		パスワード		ユーティリティ名		現在テープ位置		メモリ容量	
01	サブID								
01	サブID								
02	曜日	月	日	開始時	開始分	終了時	終了分	シャル	チャンネル
02	曜日	月	日	開始時	開始分	終了時	終了分	シャル	チャンネル
03	サブID								
02	曜日	月	日	開始時	開始分	終了時	終了分	シャル	チャンネル
03	サブID								
コード	コード								
コード	コード								

b

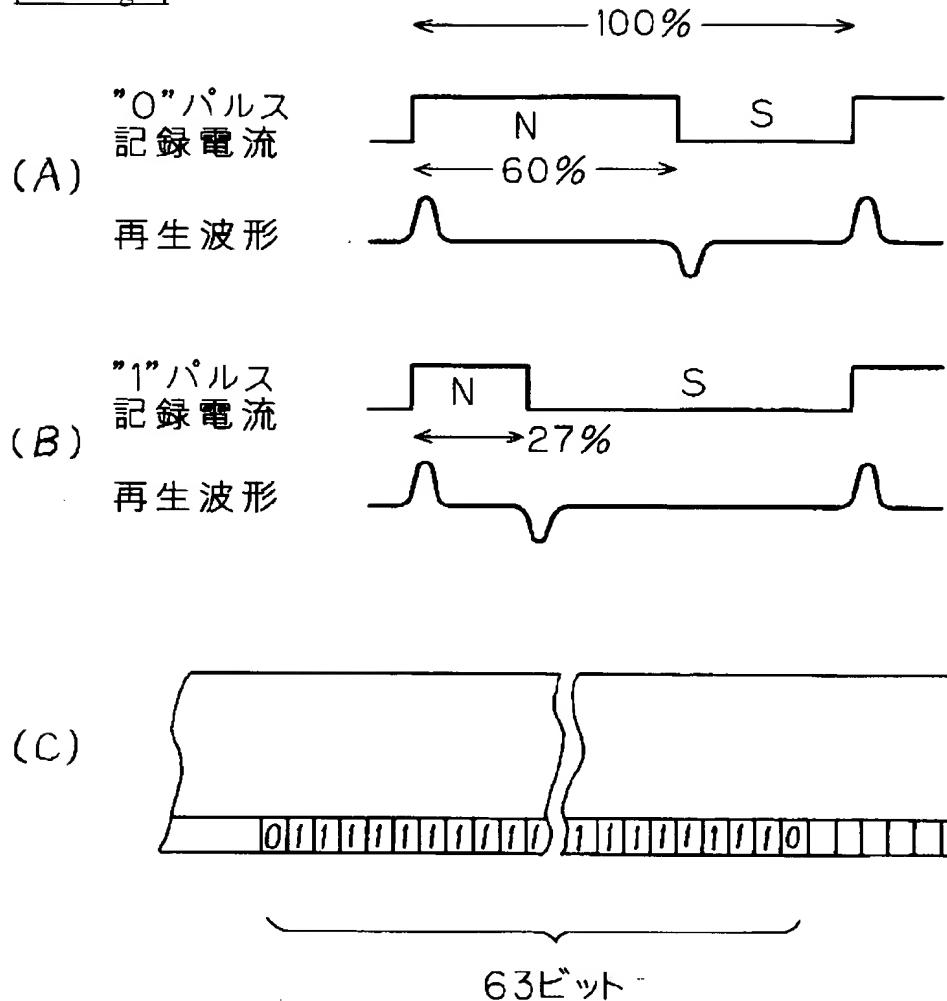
c

[Drawing 3]

- 1 カセット
- 2 磁気テープ
- 4 供給側リール
- 5 巻取側リール
- 6 供給側リール回転速度検出器
- 7 巻取側リール回転速度検出器



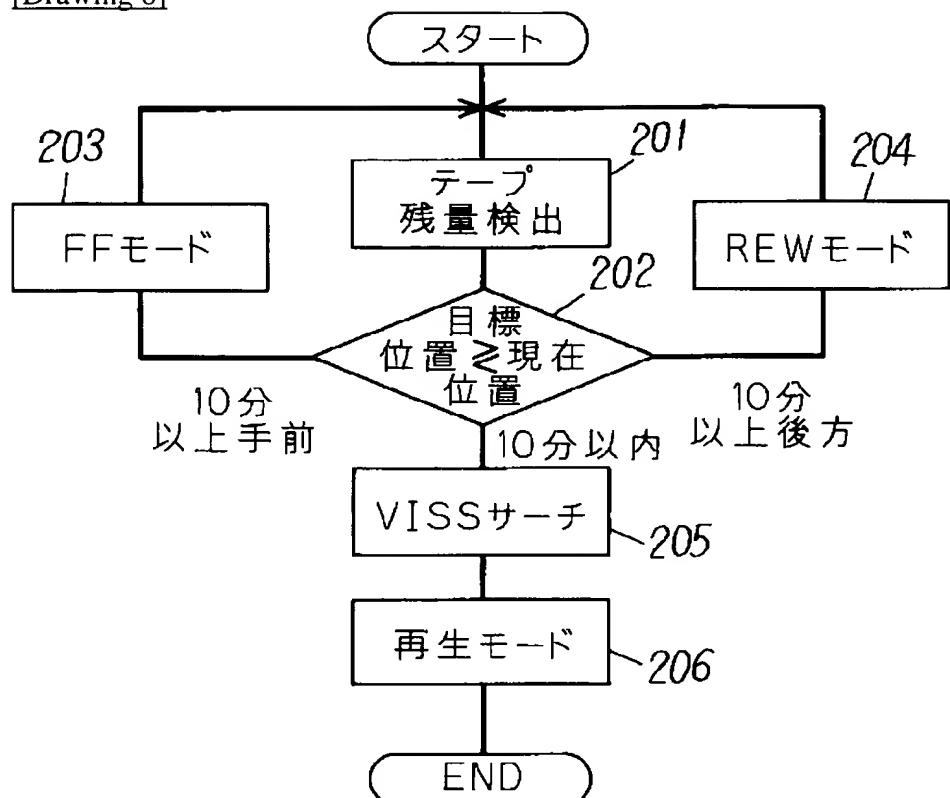
[Drawing 4]



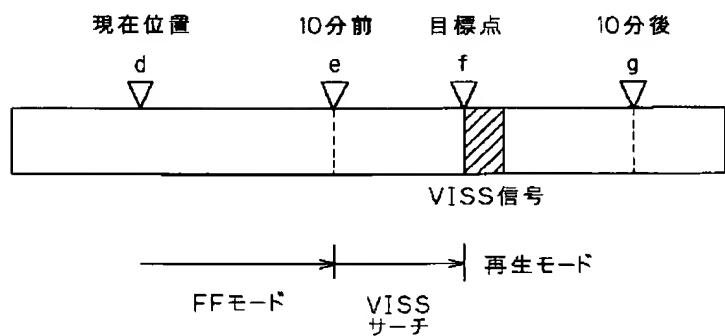
[Drawing 5]

P	DATE	TIME	CH	TITLE
1	10/20	21:00	6	ムービー
2	10/25	19:00	10	ドラマ
3	10/25	22:00	4	ニュース
4	10/27	6:00	B2	スポーツ
5	10/27	21:00	8	バラエティ

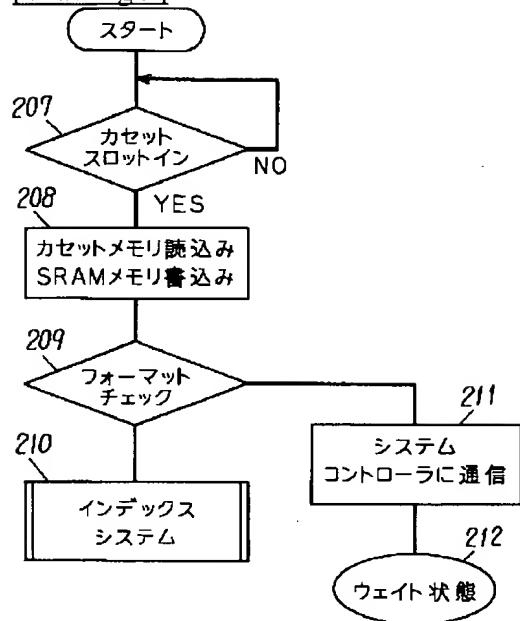
[Drawing 6]



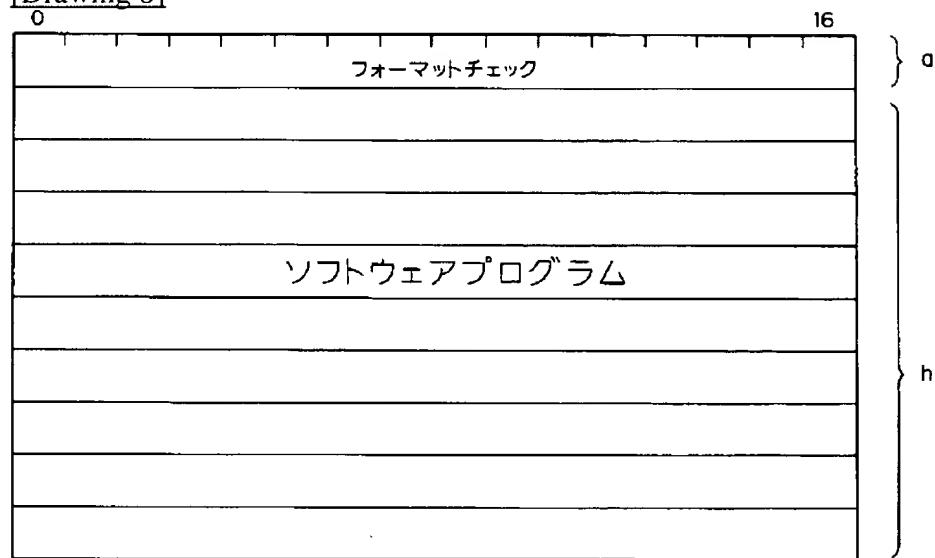
[Drawing 7]



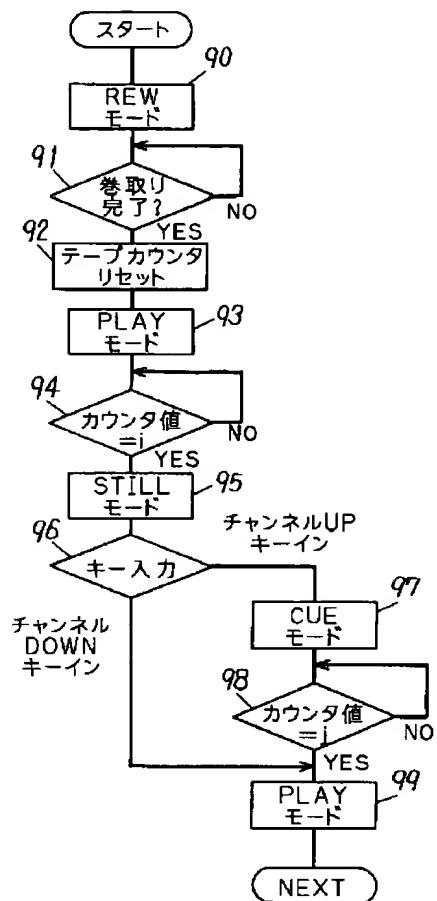
[Drawing 9]



[Drawing 8]



[Drawing 10]



[Drawing 11]

